THE INFLUENCE OF THE ADDITION OF THE PORK STOCK MEAT PREPARATION ON FORMING SENSORIAL PROFILE OF FINELY COMMINUTED PRESERVES

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Background

In the meat industry various functional additives including protein hydrolysates are applied. An example of such a preparation is a dried pork protein hydrolysate called Pork Stock, containing 92% protein. As declared by the manufacturer it strengthens the taste and flavour of meat as well as its salty taste, it absorbs water very well and it spreads uniformly over the whole volume of meat and fat mass. It is very well soluble in water and brines. It does not increase the viscosity of the solution. The hydrated Pork Stock does not form gels either in cold or during thermal treatment. It, however, co-operates well in forming gels with soya protein preparation, carrageens and starch additives.

Objective

The aim of the work was to evaluate the influence of the animal protein preparation addition on forming sensorial quality of the model meat product.

Methods

The tested material was a model, finely comminuted meat preserve made from the muscles of rear porkshank and fine fat taken from hams, according to the following composition: 70% pork meat, 30% fine fat, 40% water in the proportion to the meat and fat material, 2,2% corning salt and Fix seasoning mix. The replacement of meat with pork protein hydrolysate in the ratios of 0%, 1% and 2% to meat and fat material has been applied. The constant level of protein contents in the stuffing has been taken as a rule while replacing meat with the pork protein hydrolysate. The batter of the basic composition, with no preparation added, has been used as a control sample.

For the evaluation of the sensorial quality of the model meat preserve, the method of sensorial texture profile QDA and the quantitative descriptive analysis have been applied [Baryłko-Pikielna, 1990, Beilken and team, 1991, PR PN ISO 11035, 1994]. During the opening session various texture factors have been selected and defined, characterised orally (binding level, hardness, elasticity, juiciness and overal texture rating) as well as taste factors (sour, sweet, salty, spicy, stock, burning) and flavour factors (tart, sour, salty, spicy, stock, roast meat flavour). The intensity of factors has been marked on a 100-mm graphical scale of the respective limits. 1 mm on the graphical scale corresponded to 1 point of the evaluated factor intensity.

The desirability evaluation of model products has also been performed, taking into consideration the following factors: taste, consistency and general desirability, with the application of a 100 mm graphical scale of the following limits: it does not suit me at all (0 points), it suits me very well (100 points). The results have been expressed in conventional units (c.u.). Each test has been repeated three times. The appraisal has been carried out in the Sensorial Laboratory in the Meat and Fat Research Institute, meeting the ISO 8589 standards, with the application of a computerised ANALSENS system.

Results and discussion

The results of the sensorial quality: flavour, taste and texture have been shown in the Tab. 1. They have proven that the added Pork Stock protein preparation as well as the seasoning mix applied have had an influence on forming a rich taste and flavour profile, though the differences between the particular variants have not been statistically important.

Following the increase of the volume of meat replaced with the Pork Stock protein preparation in the preserve, the sensorial impression of tart and sour flavour has been increasing while the impression of the most desirable flavours like spicy, stock and roast meat flavour has been weakening. Following the increase of the meat exchange with the protein preparation, the impression of tart and burning tastes has been increasing while the impression of sweet, salty spicy and stock flavours has been weakening.

The statistically proven differences caused by the volume of the meat exchanged with the preparation in the model product have been reflected in the texture profile analysis factors. The exchange of meat with the protein preparation, apart from the statistically substantial increase of the impression of juiciness, has also resulted in the statistically substantial decrease of the value of the tested texture factors like binding level, hardness, elasticity and overal texture rating.

The results of the Principal Component Analysis (PCA) of the test data have been shown in the Tab. 2, in the combination of three first components in a three-dimensional space. The first main component covered 33,7% of the total variation, the second one - 19,4% of the total variation and the third one - 17,8%. It results from the data of the Tab. 2 that for the first component (PC1) the most important variations were

Table 1
Results of ANNOVA analysis

Factors	Percentage of the replacement of meat with the Pork Stock protein preparation			NIRα≤0,05
	0%	1%	2%	
flavour factors				
tart	40,9	39,2	43,0	17,7
sour	11,5	13,3	12,9	7,9
spicy	53,6	52,6	48,2	13,5
stock	42,8	38,0	38,8	22,3
roast meat flavour	26,3	23,2	22,5	19,5
taste factors				
sour	8,9	9,1	10,6	6,8
sweet	30,6	27,8	29,1	17,9
salty	32,8	30,9	27,7	7,2
spicy	54,4	50,3	48,3	9,7
stock	35,5	31,3	29,7	17,3
burning	34,8	35,1	39,1	21,4
texture factors				
binding level	$67,8^{c}$	$49,5^{b}$	$32,6^{a}$	10,1
hardness	$52,2^{c}$	$40,0^{b}$	$26,2^{a}$	10,6
elasticity	$55,0^{c}$	$39,6^{b}$	$23,9^{a}$	10,4
juiciness	$47,4^{a}$	$55,1^{b}$	$63,8^{c}$	7,2
overal texture rating	$59,2^{b}$	$56,2^{b}$	$46,3^{a}$	7,7

means in the same rows with different superscript are significantly different (P≤0,05)

Table 2
Coefficient of Eigen value (loading) for three First Components PC1, PC2 and PC3

Variables	PC1	%	PC2	%	PC3	%
flavour: tart (F_T)	0,14	3,78	0,20	5,87	0,34	9,88*
sour (F_S)	-0,22	5,95	-0,08	2,35	0,42	12,21*
spicy (F_SP)	0,14	3,78	0,42	12,32*	0,11	3,20
stock (F_ST)	-0,32	8,65	0,02	0,59	0,27	7,85
roast meat flavour (F_R)	-0,24	6,49	0,06	1,76	0,33	9,59*
taste: sour T_S)	-0,22	5,95	-0,19	5,57	0,33	9,59*
sweet (T_SW)	-0,30	8,11	-0,28	8,21	-0,14	4,07
salty (T_SA)	0,00	0,00	-0,03	0,88	-0,33	9,59*
spicy (T_SP)	0,20	5,41	0,42	12,32*	-0,02	0,58
stock (T_ST)	-0,39	10,54*	-0,09	2,64	0,04	1,16
burning (T_B)	0,21	5,68	0,17	4,99	0,38	11,05*
texture: binding level (B)	-0,20	5,41	0,42	12,32*	-0,18	5,23
hardness (H)	-0,35	9,46*	0,20	5,87	-0,22	6,40
springiness (S)	-0,33	8,92	0,23	6,74	-0,22	6,40
juiciness (J)	0,15	4,05	-0,29	8,50	0,03	0,87
overal texture rating (OTR)	-0,29	7,84	0,31	9,09*	0,08	2,33
∑/Loadings/	3,70=100%		3,41=100%		3,44=100%	

variables with loadings >9 % of the sum absolute loadings (∑/Loadings/)

those of a stock taste and hardness, for the second component (PC2) - spicy flavour and taste, binding level and general appraisal and for the third component (PC3) - burning, sour and salty tastes as well as sour, tart and roast meat flavours.

The sensorial evaluation of the desirability of model preserves depending on the level of the tested preparation added has been shown in the Tab. 3. The growing volume of the meat replaced with the preparation resulted in a statistically substantial weakening of preserve consistency. Moreover, it resulted in the weakening of taste and general desirability, though the differences were not statistically important. The preserve desirability evaluation achieved has been in conformity with the results of tests performed by Żółtowska and team (1994).

Conclusions

The exchange of meat with the Pork Stock preparation have had a statistically substantial influence on the increase of the impression of dampness but it has weakened the texture and consistency of the model preserve. The taste and general desirability have also been affected adversely though the observed trends have not been statistically substantial.

The tested preparation together with the seasoning mix has positively resulted in the formation of a rich profile of taste and flavour impressions though the observed trends between the variants have not been statistically substantial.

Table 3
Results of ANNOVA analysis

Evaluted property (c.u.)	Percentage of the replacement of meat with the Pork Stock protein preparation			NIRα=0,05
	0%	1%	2%	
taste	65,6	65,7	63,7	9,2
consistency	$67,0^{b}$	$62,9^{ab}$	$53,7^{a}$	12,0
general desirability	69,4	64,7	61,1	9,8

means in the same rows with different superscript are significantly different (P≤0,05)

References

- Baryłko-Pikielna N. 1990 - Nowe znowelizowane metody analizy sensorycznej stosowane w pracach badawczych nad żywnością [w]: Postęp w analizie żywności - pod red. S. Tyszkiewicza, tom 2, 1.
- Beilken S.L., Eadie L.M., Griffiths I., Jones P.N., Harris P.V. 1991 - Assesment of the textural quality of meat patties. Correlation of instrumental and sensory attributes - J. Food Sci., vol. 56, 6, 1465.
- PN ISO 8589 1998 – Analiza sensoryczna. Ogólne wymagania projektowania pracowni analizy sensorycznej.
- PR PN ISO 11035 1994 - Analiza sensoryczna. Metodologia. Profilowanie tekstury.
- Żółtowska A., Zaremba J., Kowalski Z. - Wybrane aspekty jakości suchych preparatów z mięsa wieprzowego. Gosp. Mięsna 1994, 10, 17-19